CLAIMS

1. A communication control method in a relay apparatus for relaying data communications between a server apparatus and a user terminal, comprising:

a step of receiving a packet containing a message requesting establishment of a connection with the server apparatus and an identification number for the connection sent from the user terminal according to a first communication protocol which is a protocol;

a step of transmitting a packet containing an acknowledgment response message that the packet has been received to the user terminal according to the first communication protocol, and establishing a connection between the server apparatus and itself according to a second communication protocol;

a step of receiving a packet containing a data transfer request message transmitted from the user terminal to the server apparatus according to the first communication protocol, and transmitting a packet containing this data transfer request message to the server apparatus according to the second communication protocol; and

a step of receiving data transmitted from the server apparatus according to the second communication protocol and transmitting a packet containing this data to the user terminal according to the first communication protocol;

wherein the first communication protocol is simpler than the second communication protocol.

2. A communication control method in a relay apparatus for relaying data communications between a server apparatus and a user terminal, comprising:

a step of receiving a packet containing a message requesting establishment of a connection to the server apparatus, an identification number for the connection and a data transfer request message for the server apparatus transmitted from the user terminal according to a first communication protocol;

a step of transmitting a packet containing an acknowledgment response message that the packet has been received to the user terminal according to the first communication protocol, establishing a connection between the server apparatus and itself according to a second communication protocol, and transmitting a packet containing the data transfer request message to the server apparatus; and

a step of receiving data transmitted from the server apparatus according to the second communication protocol and transmitting a packet containing this data to the user terminal according to the first communication protocol;

wherein the first communication protocol is simpler than the second communication protocol.

3. A communication control method according to claim 1 or 2, wherein the number of signals used in establishing the connection between the user terminal and the relay apparatus according to the first communication protocol is less than the number of signals used in establishing the connection between the relay apparatus and the server apparatus according to the second communication protocol.

4. A communication control method according to claim 1 or 2, wherein a communication interval between the user terminal and the relay apparatus is composed of a radio-oriented interval, and a communication interval between the

relay apparatus and the server apparatus is composed of a wire-oriented interval.

5. A communication method for performing data communications between a server apparatus and a user terminal, wherein communication control procedure in an upper layer containing a transport layer in the data communications comprises:

a first step of transmitting a first packet containing a message requesting establishment of a connection and an identification number for the connection from the user terminal to the server apparatus;

a second step of transmitting a second packet containing an acknowledgment response message that this first packet has been received from the server apparatus to the user terminal; and

a third step of transmitting a third packet containing actual data to the user terminal by designating the identification number from the server apparatus after the connection has been established between the user terminal and the server apparatus.

6. A communication method for performing data communications between a user terminal and a relay apparatus for relaying data communications between the user terminal and a server apparatus, wherein communication control procedure in an upper layer containing a transport layer in the data communications comprises:

a first step of transmitting a first packet containing a message requesting establishment of a connection and an identification number for the connection from the user terminal to the relay apparatus;

a second step of transmitting a second packet

containing an acknowledgment response message that this first packet has been received from the relay apparatus to the user terminal; and

a third step of transmitting a third packet containing actual data supplied to the relay apparatus according to a predetermined protocol from the server apparatus to the user terminal by designating the identification number after the connection has been established between the user terminal and the relay apparatus.

7. A communication method according to claim 5, wherein

in the first step, the user terminal transmits data size information indicating the maximum size of data that it is capable of receiving at once to the server apparatus; and

the server apparatus obtains the maximum size from the data size information which has been received, and divides the actual data for transmission to the user terminal if the size of the third packet exceeds the maximum size.

8. A communication method according to claim 6, wherein

in the first step, the user terminal transmits data size information indicating the maximum size of data that it is capable of receiving at once to the relay apparatus; and

the relay apparatus obtains the maximum size from the data size information which has been received, and divides the actual data for transmission to the user terminal if the size of the third packet exceeds the maximum size.

9. A server apparatus for performing data communications

with a user terminal, comprising:

communication control means for performing communication control at an upper layer level containing a transport layer when performing the data communications;

the communication control means comprising:

means for receiving a first packet containing a message requesting establishment of a connection and an identification number for the connection transmitted from the user terminal;

means for transmitting a second packet containing an acknowledgment response message that this first packet has been received to the user terminal; and

means for transmitting a third packet containing actual data to the user terminal by designating the identification number after the connection has been established with the user terminal.

10. A relay apparatus for relaying data communications between a server apparatus and a user terminal, comprising:

communication control means for performing communication control at an upper layer level containing a transport layer when performing the data communications;

the communication control means comprising:

means for receiving a first packet containing a message requesting establishment of a connection and an identification number for the connection transmitted from the user terminal;

means for transmitting a second packet containing an acknowledgment response message that this first packet has been received to the user terminal; and

means for transmitting a third packet containing actual data supplied from the server apparatus to the relay apparatus according to a predetermined protocol to the user

terminal by designating the identification number after the connection has been established between the user terminal and itself.

11. A relay apparatus for relaying data communications between a server apparatus and a user terminal, comprising:

means for receiving a packet containing a message requesting establishment of a connection with the server apparatus and an identification number for the connection transmitted from the user terminal according to a first communication protocol;

means for transmitting a packet containing an acknowledgment response message that the packet has been received to the user terminal according to the first communication protocol, and establishing a connection between the server apparatus and itself according to a second communication protocol;

means for receiving a packet containing a data transfer request message transmitted from the user terminal to the server apparatus according to the first communication protocol, and transmitting a packet containing this data transfer request message to the server apparatus according to the second communication protocol; and

means for receiving data transmitted from the server apparatus according to the second communication protocol and transmitting a packet containing this data to the user terminal according to the first communication protocol;

wherein the first communication protocol is simpler than the second communication protocol.

12. A relay apparatus for relaying data communications between a server apparatus and a user terminal, comprising:

means for receiving a packet containing a message requesting establishment of a connection to the server apparatus, an identification number for the connection and a data transfer request message for the server apparatus transmitted from the user terminal according to a first communication protocol;

means for transmitting a packet containing an acknowledgment response message that the packet has been received to the user terminal according to the first communication protocol, establishing a connection between the server apparatus and itself according to a second communication protocol, and transmitting a packet containing the data transfer request message to the server apparatus; and

means for receiving data transmitted from the server apparatus according to the second communication protocol and transmitting a packet containing this data to the user terminal according to the first communication protocol;

wherein the first communication protocol is simpler than the second communication protocol.

13. A relay apparatus according to claim 11 or 12, wherein the number of signals used in establishing the connection between the user terminal and the relay apparatus according to the first communication protocol is less than the number of signals used in establishing the connection between the relay apparatus and the server apparatus according to the second communication protocol.

14. A relay apparatus according to any one of claims 10-12, wherein a communication interval between the user terminal and the relay apparatus is composed of a radio-oriented interval, and a communication interval between the

relay apparatus and the server apparatus is composed of a wire-oriented interval.

15. A communication system, wherein a user terminal and a server apparatus are connected via a relay apparatus according to any one of claims 10-12.

16. A terminal device for performing data communications with a server apparatus, comprising:

communication control means for performing communication control on an upper layer level containing a transport layer when performing the data communications;

the communication control means comprising:

means for transmitting a first packet containing a message requesting establishment of a connection and an identification number for the connection;

means for receiving a second packet containing an acknowledgment response message that the first packet has been received transmitted from the server apparatus; and

means for receiving a third packet containing actual data transmitted from the server apparatus by designating the identification number after the connection has been established with the server apparatus.

17. A terminal device for performing data communications with a server apparatus via a relay apparatus for managing a connection with the terminal device, comprising:

communication control means for performing communication control on an upper layer level containing a transport layer when performing the data communications;

the communication control means comprising:

means for transmitting a first packet containing a message requesting establishment of a connection with the

relay apparatus and an identification number for the connection;

means for receiving a second packet containing an acknowledgment response message that the first packet has been received transmitted from the relay apparatus; and

means for receiving a third packet containing actual data supplied from the server apparatus to the relay apparatus according to a predetermined protocol and transmitted from the relay apparatus by designating the identification number after the connection has been established between the relay apparatus and itself.

18. A terminal device for performing data communications with a server apparatus via a relay apparatus for managing a connection with the terminal device, comprising:

means for transmitting a packet containing a message requesting establishment of a connection with the server apparatus and an identification number for the connection according to a first communication protocol;

means for receiving a packet containing an acknowledgment response message that the packet has been received transmitted from the relay apparatus according to the first communication protocol;

means for transmitting a packet containing a data transfer request message to the server apparatus according to the first communication protocol; and

means for receiving according to the first communication protocol a packet containing actual data supplied from the server apparatus to the relay apparatus according to a second communication protocol in response to the data transfer request message;

wherein the first communication protocol is simpler than the second communication protocol.

19. A terminal device for performing data communications with a server apparatus via a relay apparatus for managing a connection with the terminal device, comprising:

means for transmitting a packet containing a message requesting establishment of a connection with the server apparatus, an identification number for the connection and a data transfer request message for the server apparatus according to a first communication protocol;

means for receiving a packet containing an acknowledgment response message that this packet has been received transmitted from the relay apparatus according to the first communication protocol; and

means for receiving according to the first communication protocol a packet containing actual data supplied from the server apparatus to the relay apparatus according to a second communication protocol in response to the data transfer request message;

wherein the first communication protocol is simpler than the second communication protocol.

20. A terminal device according to claim 18 or 19, wherein the number of signals used in establishing the connection between the user terminal and the relay apparatus according to the first communication protocol is less than the number of signals used in establishing the connection between the relay apparatus and the server apparatus according to the second communication protocol.

21. A terminal device according to any one of claims 17-19, wherein a communication interval between the user terminal and the relay apparatus is composed of a radio-oriented interval, and a communication interval between the

relay apparatus and the server apparatus is composed of a wire-oriented interval.